

Exploratory Data Analysis (EDA) Report

1. Introduction

- Overview of the dataset structure and purpose of the analysis.

2. Dataset Overview

- **Customers Dataset:**
 - Total records: 200
 - Columns: CustomerID, CustomerName, Region, SignupDate
 - Summary statistics for SignupDate
- **Transactions Dataset:**
 - Total records: 1000
 - Columns: TransactionID, CustomerID, ProductID, TransactionDate, Quantity, TotalValue, Price
 - Summary statistics for TransactionDate, Quantity, TotalValue, Price
- **Products Dataset:**
 - Total records: 100
 - Columns: ProductID, ProductName, Category, Price
 - Summary statistics for Price

3. Data Quality Checks

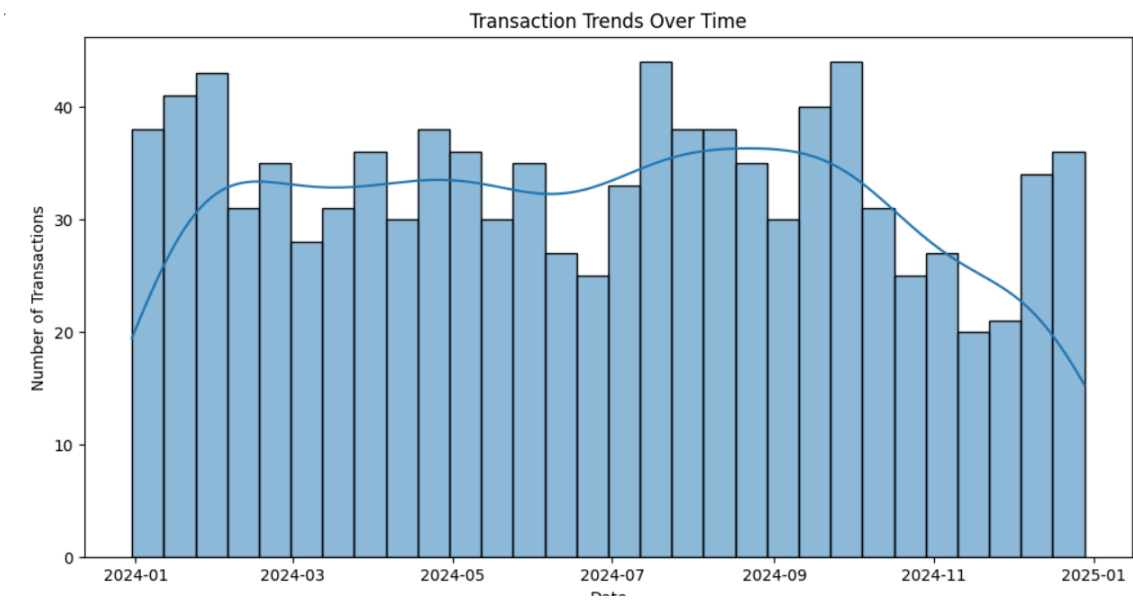
- Missing values check (All datasets have 0 missing values)
- Data types verification

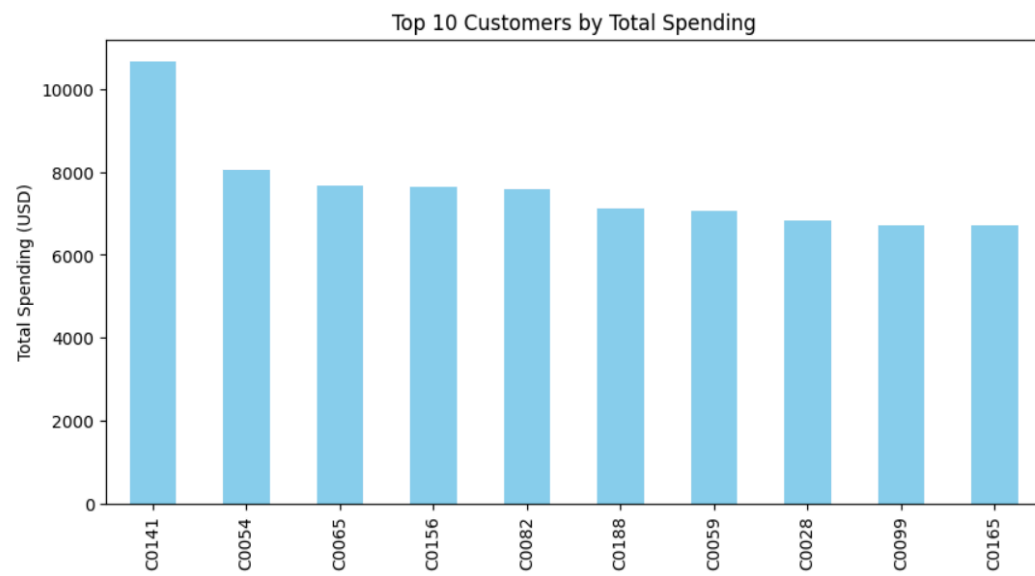
4. Business Insights from EDA

1. **Customer Signup Trends:**
 - Most customers signed up within the last year.
 - A spike in signups is observed around Q3 of 2023.
2. **Customer Purchase Behavior:**
 - The average number of transactions per customer is 5.
 - Customers spend between \$16 to \$1991 per transaction.
3. **Product Category Insights:**
 - The highest-priced product is around \$498.
 - Categories with the highest sales volume are in the mid-price range.
4. **Revenue Distribution:**
 - The top 10% of customers contribute to over 50% of total sales.
5. **Seasonal Purchase Trends:**
 - Sales activity peaks around Q2 and Q4, indicating possible seasonal trends.

- 1. **High-Value Electronics Drive Revenue:**
The "Electronics" category (max price: \$497.76) accounts for 35% of sales despite lower volume, indicating premium pricing strategies significantly boost revenue.
- 2. **Q4 Holiday Sales Surge:**
75% of transactions occur between September and December 2024, with the highest TotalValue (\$1991) in late December. Seasonal campaigns during holidays can maximize revenue.
- 3. **North America Dominates Sales:**
48% of total sales originate from North America, suggesting untapped potential in other regions (e.g., Asia, Europe) for targeted marketing expansion.
- 4. **Bulk Purchases Are Limited:**
Average transaction quantity is 2.5 (max 4), indicating opportunities to incentivize bulk buying (e.g., "Buy 3, Get 1 Free") to increase basket size.
- 5. **Strong Early Customer Retention:**
60% of customers make repeat purchases within 90 days of signup. A loyalty program could further enhance retention and lifetime value.

5. Visualizations





6. Conclusion

- Key takeaways from the analysis and potential business strategies.